Press release
Nota de prensa

Madrid, Spain 24 February, 2022

Enabling 6G: from low-power technologies for communication to machine learning analytics for privacy preservation

IMDEA Networks has recently been awarded the **coordinated project ENABLE-6G** of the national call UNICO 5G. The project consists of two sub-projects, RISC-6G and MAP-6G, and it will be developed by a group of researchers led by Dr. Domenico Giustiniano and Dr. Joerg Widmer. This grant will allow the Institute to continue to do pioneering research in the field of networks and contribute to the development of the next generation of 6G technology.

Future 6G networks will go far beyond 5G use cases, involving a vast number of connected devices, significantly higher performance requirements, and support for detailed object and environment sensing in addition to communication. To this end, 6G networks will need to embrace new capabilities. The RISC-6G sub-project will address this problem aiming to **improve wireless communications**, provide environmental sensing, and significantly lower the per-device energy footprint to avoid a huge increase in overall network power consumption.

Two key technologies will be explored to achieve these ambitious objectives, namely **low-power visible light communication** (using LED lights to transmit data across the visible spectrum) and **reconfigurable intelligence surfaces** (retrofitting surface on walls with communication capabilities). “Integration of intelligent reflective surfaces (RIS) will improve network capacity and more import resilience to link disruption, thus improving mobile services on which citizens and industry rely. At the same time, the improvement in wireless sensing made possible through RISs will enable entirely new services, for example in remote healthcare and environment monitoring”, explains Joerg Widmer, PI of one of these projects.

On the other hand, the MAP-6G sub-project will contribute to the vision that 6G will make possible full sensory immersion in cyberspace, yet requiring handling the deluge of data to enable not only significantly improved network performance but also substantially more complex services. In particular, **a concept that is envisioned for 6G by 2030 is the one of a digital twin**, that consists of a virtual representation of a physical object in its real-time digital counterpart. While highly promising, these new services and analytics may also pose a threat to privacy. **MAP-6G will design native privacy-preserving machine learning mechanisms for 6G applications** to manage the vast amount of data generated by services in 6G networks. “Project solutions will leverage emerging concepts like ‘federated learning’ for sharing with the network infrastructure only the metadata that is necessary to provide these services while shielding personal data”, adds Prof. Giustiniano.

The final demonstrators will integrate the developed modules within the mobile network using

testbeds comprising data servers, edge nodes, and end-user devices, with the help of the industrial partners in the project. **The innovation of the coordinated project will develop favorable market conditions that will create a sustainable business for all players** in the value chain and will boost Spanish, European, and global market growth. "A large percentage of the budget is allocated to the industry through competitive tender calls, with the objective of supporting the applied research of the project, and fostering market adoption. This will not only benefit the partners directly working on the project but also other potential stakeholders, thanks to dedicated activities that will be performed in the project for community development to attract Small and Mid-size enterprises (SMEs) and startups.", highlights Prof. Giustiniano.

Also, the research will benefit the development of commercial equipment, industrial-grade prototypes as well as more flexible and open experimental platforms, **useful for early-stage 6G proofs of concept**. In short, the ENABLE-6G project started in January 2022, is timely, as the solutions that will be designed can be incorporated in the pre-6G systems that are expected to be ready for deployment around the same time of the conclusion of the project (December 2024).

Source(s): IMDEA Networks Institute

URL: Enabling 6G: from low-power technologies for communication to machine learning analytics for privacy preservation

About us

IMDEA Networks Institute, promoted by the Regional Government of Madrid, is a research organization on computer and communication networks whose multinational team is engaged in cutting-edge fundamental science and technology. As a growing, English speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies**. Our team of highly-reputed researchers is designing and creating today the networks of tomorrow.

Some keywords that define us: 5G, Big Data, blockchains and distributed ledgers, cloud computing, content delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network security, networked systems, network protocols and algorithms, network virtualization (software defined networks – SDN and network function virtualization – NFV), privacy, social networks, underwater networks, vehicular networks, wireless networks and more…

IMDEA Networks Institute
28918 Leganes (Madrid) Spain
Avda. del Mar Mediterráneo, 22

+34 91 481 6210
mediarelations.networks@imdea.org
www.networks.imdea.org

Twitter: @IMDEA_Networks | Facebook | Instagram | Flickr | YouTube